harvested in South Africa for building material and fire wood. The growth rates of the mangroves must be determined to ensure a balance between harvesting and the persistence of adult trees for propagule production. The aim of the study was to determine the growth rates of *Avicennia marina*, *Bruguiera gymnorrhiza* and *Rhizophora mucronata* in response to the prevailing physical and sediment characteristics in the Mngazana Estuary. Redox potential, pH, conductivity, organic matter and moisture of the sediment as well as salinity, conductivity and temperature of the porewater were measured in nine sites over a spring and neap tide. Redox potential of the sediment ranged from −44.7 to 251.8 mV at all sites and is expected to correlate to organic matter and moisture content. Variations in growth were expected between sampling periods and between sites. This variation may be due to physical parameters such as sediment condition particularly redox potential or biological factors such as plant density and species competition. *Bruguiera* (~6 cm/yr) and *Rhizophora* (~3.5 cm/yr) grew faster than *Avicennia* (~1.5 cm/yr) when all three species were present. These results will used to generate a population model to determine cutting limits for harvesting of the mangrove trees.

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Phylogenetic studies in southern African Thicket: *Schotia* Jacq. (Fabaceae)

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The genus *Schotia* consists of four species. The genus has a southern African distribution, and ranges from southern Zimbabwe and Mozambique to South Africa and Namibia. *Schotia* has a notable presence in the Thicket Biome, and could potentially be an important indicator of Thicket biogeography. It has been proposed as one of the "early" or "original" thicket taxa, and the genus has affinities with other taxa from similar biomes across the world. The aim of this study was firstly to use DNA sequence data to study inter-specific phylogenetic relationships and secondly to relate the results obtained to Thicket biogeography. Preliminary results show that, where represented by multiple samples, species of *Schotia* are non-monophyletic. Most of the clades did not reveal geographic patterns or structure. These results maybe due to hybridization and/or incomplete lineage sorting, and could also suggest that the species in the genus could be of comparatively recent evolutionary origin. Sampling is still incomplete, as we have not sampled species across their entire geographical ranges. *Schotia* may thus comprise recent species (some capable of hybridization) that have evolved in thicket refugia. More exhaustive sampling may allow us to locate these refugia.

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Molecular analysis of *in vitro Salvia africana-lutea* L. organ cultures

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Salvia africana-lutea has long been used in folk medicine by traditional healers in the Western Cape Province, South Africa for various ailments. In this study, biotechnological approaches were used to highlight the phytochemistry of this important aromatic herb. A continuous shoot culture was successfully established on solid Murashige and Skoog (1962) (MS) medium containing BA (0.5 mg/L) and NAA (0.2 mg/L). These shoots were rooted in medium without PGRs prior to acclimatisation for transfer to the greenhouse. Hairy root cultures were established by transformation with *Agrobacterium rhizogenes* strains A4T and LBA9402. Out of four different media tested, half-strength MS was optimal for transgenic root growth. The PCR and Southern hybridisation techniques confirmed transgenesis in the different hairy root clones. In addition, metabolite profiling of both shoot and root cultures using GCMS showed interesting changes in the chemical footprint of *S. africana-lutea*. The microenvironment seems to induce *de novo* biosynthesis of pharmacologically-active compounds in microplants as these extracts are more biologically active compared to non-propagated plants. Therefore, tissue culture in this case not only serves as a tool for the conservation of this medicinally popular herb but may also be useful for producing a new subset of secondary metabolites.

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Systematics of *Rhoicissus* Planch. (Vitaceae)

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Rhoicissus Planch., confined to Africa, comprises about 12 species. It is a member of the family Vitaceae (*grapevine and Virginia creeper*), a family widespread in the tropics and subtropics of both the northern and southern hemispheres. The interrelationships and delimitation of the family is a matter of controversy. In recent studies Vitaceae is placed in different clades and orders. The family Leeaceae is here included in Vitaceae. Generic limits and the delimitation of species within genera are also in a state of flux. *Rhoicissus* and *Leea* show similarity in their wood anatomy. The shape of the flower buds, structure of the floral disc and inflorescence morphology are characters distinguishing *Rhoicissus* from *Cissus*, *Cyphostemma*, *Cayratia* and *Ampelocissus,* the genera of the family known from the African continent. Delimitation of the species in *Rhoicissus* is also problematic because of an extremely high degree of polymorphism occurring in the genus. The most complete and current phylogenetic hypothesis concluded that along with *Ampelopsis*, *Clematicissus*, *Cissus* and *Ampelocissus*, *Rhoicissus* forms a series of successively branching sister clades to other Vitaceae. Of these genera, *Rhoicissus* appears to be most closely allied to *Ampelopsis,* mainly based on rbcL data. *Ampelopsis* is a genus of about 25 species, native to the temperate and subtropical regions of America and Asia.

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Tissue culture of *Brunsvigia undulata*

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Brunsvigia undulata F.M.Leight., a member of the Amaryllidaceae, has immense ornamental value due to its large umbel of bright red to pink flowers. It has been used in Xhosa, Sotho and Zulu traditional medicine to sooth and heal wounds and in the treatment of renal complaints. In an attempt to tissue culture *B. undulata* twin scales cut from the bulbs of the plant were cultured on solid Murashige and Skoog media with combinations of 0, 2.22, 4.44, 8.88 and 44.4 μM 6-benzyladenine and 0, 2.685, 5.37, 10.74 and 53.7 μM naphthalene acetic acid. Twin scales were a successful explant for the production of bulblets *in vitro*. Bulblets formed on the twin scales were excised and used to test the effects of hormone concentrations, media type (liquid or solid), light and temperature on bulblet multiplication.

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